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or perhaps methods of an entirely new sort will be needed. At all events, more attention must be given to the steps involved in proving the causal relation of definite microorganisms to definite biological activities in the soil in order to avoid making loose statements in regard to the functions of these organisms, such as have often been made in the past.

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July 25, 1917

THE FIRST PUEBLO RUIN IN COLORADO MENTIONED IN SPANISH DOCUMENTS

THERE is in the Congressional Library, among the documents collected by Peter Force, a manuscript diary of early exploration in New Mexico, Colorado, and Utah, dated 1776, written by two Catholic priests, Father Silvester Velez Escalante and Father Francisco Atanacio Dominguez. This diary is valuable to students of archeology, as it contains the first reference to a prehistoric ruin in the confines of the present state of Colorado, although the mention is too brief for positive identification of the ruin.<sup>1</sup> While the context indicates its approximate site, there are at this place at least two large ruins, either of which might be that referred to. I have no doubt which one of these two ruins was indicated by these early explorers, but my interest in this ruin is both archeological and historical. Our knowledge of the structure of these ruins is at the present day almost as imperfect as it was a century and a half ago.

The route followed by the writers of the diary was possibly an Indian pathway, and is now called the old Spanish Trail. After entering Colorado it ran from near the present site of Mancos to the Dolores. On the four-

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution.

<sup>2</sup> *Diarrio y Dereotero de las neuvas descubrimientos de tierras á los r'bos N.N.O.E.OE. del Nuevo Mexico por los R.R.P.P.Fr. Silvester Valez Escalante, Fr. Francisco Atanacio Dominguez, 1776.* (*Vide* Sen. Ex. Doc. 33d Congress, No. 78, pt. 3, pp. 119-127.)

teenth day from Santa Fe, we find the following entry: "En la vanda austral del Vio [Rio] sobre un alto, huvo antiquam (te) una Poblacion pequena, de la misma forma q<sup>e</sup> las de los Indios el Nuevo Mexico, segun manifieran las Ruinas q<sup>e</sup> de invento registramos."

By tracing the trip day by day, up to that time, it appears that the ruin referred to by these early fathers was situated somewhere near the bend of the Dolores River, or not far from the present town of Dolores, Colorado. The above quotation indicates that the ruin was a small settlement, and situated on a hill, on the south side of the river or trail, but it did not differ greatly from the ruined settlements of the Indians of New Mexico with which the writers were familiar, and had already described.

A century later, 1876, we find a published reference to a ruin near the bend of the Dolores, which suggests the above mentioned. An exploring expedition of the engineer department of the United States Army from Santa Fé, New Mexico, to the junction of the Grand and Green Rivers of the Great Colorado of the west, under command of Capt. J. M. Macomb, U. S. A., in 1859, followed the old Spanish Trail. Professor J. S. Newberry, of the expedition, in a geological report described a ruin not many miles from the bend of the Dolores: "Surouaro is the name of a ruined town which must have contained a population of several thousands [sic]. The same is said to be of Indian (Utah) origin, and to signify desolation, and certainly no better could have been selected. . . . The houses are, many of them, large, and all built of stone, hammer-dressed on the exposed faces. Fragments of pottery are exceedingly common, though, like the buildings, showing great age. The remains of metates (corn mills) are abundant about the ruins. The ruins of several large reservoirs<sup>3</sup> built of masonry may be seen at Surouaro, and there are traces of acequias which led to them through which water was brought perhaps from a great distance."

<sup>3</sup> Probably kivas, but impossible to identify without excavations. J. W. F.

On several maps, as that accompanying a report of another survey across the continent, by William J. Palmer, published in 1867 and 1868, sites of ruins are indicated in southwestern Colorado. Printed references to Surouaro are made by Jackson, Holmes, Prudden, and other writers, but aside from the statement of the last mentioned, that it is a cluster of mounds indicating pueblos of the unit type, we know little regarding their size and architectural peculiarities. The arrangement of mounds in a cluster, like many others in the cedar clearings, suggests the Mummy Lake group on the Mesa Verde, and it is probable that each member of the group if excavated will be found to resemble Far View House.

My attention was called to a ruin near Dolores by Mr. R. W. Williamson, of that city, and not being able to visit the site I urged him and others to collect more details, from which my belief was confirmed that the ruin mentioned by the Spanish fathers is the same as Newberry's Surouaro.

As one fruit of my inquiries for corroboratory evidences bearing on the identification of the oldest mentioned ruin, I obtained unexpected information from Mr. J. W. Emerson, a ranger on the Montezuma Forest Reserve, who is well acquainted with the region near Dolores. In a letter received a short time ago from Mr. Gordon Parker, supervisor of the reserve, who has always shown great interest in my work at the Mesa Verde, there was enclosed a copy of a report made by Mr. Emerson to the Forest Service, on a remarkable ruin near Dolores which, although not corroborating the above identification, greatly intensified the desire of several years to visit the area in which lies the supposed first ruin in Colorado mentioned in writings by white men. Mr. Emerson's report is accompanied by a rude ground plan, indicating a ruin as unusual in form as the mysterious Sun Temple of the Mesa Verde Park, which it somewhat resembles.

It does not answer the description of Surouaro by Newberry, and its exceptional character would not have impressed the Spanish fathers, if they noticed it at all. In fact, judging from

the "ground plan" furnished by Mr. Emerson, its form is remarkable even in a region where many different forms exist.

I will not occupy the reader's time with the details of the building revealed in this report, as they would be more appropriate in a formal article and can be greatly augmented by excavations, but will point out that its form is roughly semicircular, the plan showing concentric walls bounding rooms separated by partitions, the outer straight wall on the south side being like the south wall of Sun Temple. The building measures 100 by 80 feet, exhibiting masonry characteristic of the purest pueblo type. A complete excavation promises to reveal data on the connection between the prehistoric towers of the southwest, circular ruins, and the problematical Sun Temple.

It is evident that the southwestern corner of Colorado, from which locality not a single ruin had been recorded a century and a half ago, contains some of the largest, best constructed, and most mysterious pueblo ruins and cliff dwellings in the United States, and offers unusual data bearing on the history of aboriginal American culture.

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SCIENTIFIC EVENTS  
PRODUCTION OF NITRATES BY THE  
GOVERNMENT

ANNOUNCEMENT is made by the War Department of its preparations for the production of nitrates in accordance with a report filed by the Nitrate Supply Committee. This report is given in part below. It is further stated that for the present the location of the proposed nitrate plant is withheld, but information concerning its location will be given as soon as a definite decision is reached. The work of supplying the machinery and materials needed for the plant has begun.

The Nitrate Supply Committee, appointed by the Secretary of War, was under authority of a provision in the national defense act for an investigation "to determine the best,